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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,276	02/25/2004	Peter D. Brewer	B-4712 620052-7	5160

36716 7590 01/06/2006

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EXAMINER

PHAM, THANHHA S

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 01/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/787,276

Applicant(s)

BREWER, PETER D. 

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 6-8, 13-17 and 24-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9-12 and 18-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>05/07/2004</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

This Office Action is in response to Applicant's Election dated 10/24/2005.

### ***Election/Restrictions***

1. Claims 6-8, 13-17 and 24-32 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected invention. Applicant timely traversed the restriction (election) requirement in the reply filed on 10/24/2005.
2. Applicant's election with traverse of claims 1-5, 9-12 and 18-23 in the reply filed on 10/24/2005 is acknowledged. The traversal is on the ground(s) that 35 U.S.C. 121 does not require the USPTO to restrict an application to if two or more independent and distinct inventions are claimed in one application. This is not found persuasive because the application includes distinct inventions and species as set forth in the Office Action dated 09/22/2005. There must be a serious burden on the examiner if distinct inventions and species are not restricted since different fields of search and consideration are required to different distinct invention and species. Therefore, the requirement is still deemed proper and is therefore made FINAL.

### ***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the coating layer

**uniformly covering** the defects must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

**4. Claim 20, 22 and 23 are objected to because of informalities. Appropriate correction is required to clarify scope of claim.**

► With respect to claims 20, 22 and 23, "a group comprising" should be changed to "a group consisting of" to clarify scope of claim.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**5. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

“the coating layer” lacks antecedent basis. In addition, it is not clear how covering is considered as **uniformly** covering.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**6. Claims 1-3 and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujisada et al [JP 58-18928].**

► With respect to claim 1 and 3, Fujisada et al (figs 1's-2's and text pages 119-120) discloses a method for removing defect (2, fig 1's-2's) from a semiconductor surface (1) comprising:

coating the semiconductor surface (surface of wafer 1, fig 2a) and the defects (2) with a protective layer (3) wherein the protective layer is a photoresist layer;

thinning the protective layer (3, fig 2b) to selectively reveal portions of the defects (2); and

removing the protective layer (3, fig 2d).

► With respect to claim 2, as being best understood, Fujisada et al (fig 2a) shows the protective layer (3) provides a planar coating surface and the protective layer totally covers the defects (2).

► With respect to claim 18, Fujisada et al discloses removing of the defects (2) is performed by etching.

► With respect to claim 19, a process of thinning the protective layer (3, figs 2a-2b) of Fujisada et al is identical to a process for removing the protective layer (3, figs 2c-2d) of Fujisada et al since both process removes the same material of protective layer (3) from the surface of the semiconductor wafer (1).

► With respect to claim 20, Fujisada et al (text part 3 in page 119) discloses the semiconductor surface (surface of wafer 1) comprises a semiconductor selected from a group consisting of GaSb, InAs, Si, InP, GaAs, InAs and AlSb.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**7. Claims 4-5 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujisada et al [JP 58-18928] in view of Kudo et al [JP 63-216346] or Chiu et al [US 6,955,177].**

► With respect to claims 9, 11 and 12, Fujisada et al substantially discloses the claimed method including thinning the protective layer (3) of photoresist. Fujisada et al does not specifically mention how to thin the protective layer of the photoresist layer. More particularly, Fujisada et al does not expressly teach using ICP oxygen process, RIE or ERC for thinning the protective layer of photoresist. However, ICP oxygen process, RIE and ERC are known technique to etch/remove photoresist material. See Chiu et al and Kudo et al as evidences that shows using ICP oxygen process, RIE or ERC for removing photoresist material. Therefore, at the time of invention, it would have been obvious for those skilled in the art, in view of Chiu et al or Kuo et al, to use the ICP oxygen process, RIE or ERC as known technique for removing photoresist material of the protective layer in the thinning step process of Fujisada et al to reveal portions of the defects for removing said defects to provide a better semiconductor device.

► With respect to claims 4-5 and 10, the claimed range thickness of the photoresist layer and the etch rate of the thinning process are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in In re Aller 105 USPQ233, 255 (CCPA 1955), the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

*See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Moreover, the claims are prima facie obvious without showing that the claimed ranges achieve unexpected results. *See In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990); In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996); In re Boesch, 205 USPQ 215 (CCPA 1980).*

**8. Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujisada et al [JP 58-18928] in view of Takehiko et al [JP 06041770] or Starzynski [US 2005/0065050]**

Fujisada et al substantially discloses the claimed method including removing the defects from the semiconductor surface by etching. Fujisada et al does not expressly



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teach using a wet chemical etchant [**claim 21**] to remove the defect wherein the defects are removed by a chemical etchant selected from the group consisting of citric acid, HCl and acetic acid [**claim 22**] or the group consisting of : i) a KOH (potassium hydroxide), water, isopropyl alcohol additive solution; ii) an ethylene diamine pyrocatechol, water, pyrazine additive solution; iii) a TMAH (tetramethyl ammonium hydroxide), water solution; and iv) a hydrazine ( $N_2H_4$ ), water, isopropyl alcohol solution [**claim 23**].

However, Takehiko et al and Starzynski et al teach using the wet chemical etchant to clean/remove defects to the semiconductor surface. Therefore, at the time of invention, it would have been obvious for those skilled in the art, in view Takehiko et al or Starzynski et al, to use the wet chemical etchant as being claimed as known etchants to clean the semiconductor surface in the process of Fujisada et al to remove the defect for providing a better semiconductor device. Selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." 325 U.S. at 335, 65 USPQ at 301. See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious).

### **Conclusion**

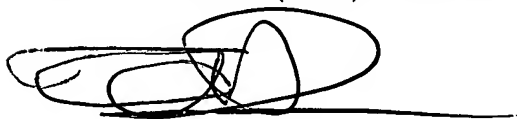
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-

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1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, consisting of several loops and a horizontal line at the bottom.

Thanhha Pham